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| 09/883,683 | 06/18/2001 | Junjie Zhu | P/2778-13 | 1041 |
| 2352 | 7590 | 11/17/2004 | EXAMINER VARTANIAN, HARRY | |
| OSTROLENK FABER GERB & SOFFEN 1180 AVENUE OF THE AMERICAS NEW YORK, NY 100368403 | | | ART UNIT 2634 | PAPER NUMBER |

DATE MAILED: 11/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/883,683

Applicant(s)

ZHU ET AL.

Examiner

Harry Vartanian

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06182001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15-23 is/are allowed.
- 6) ☒ Claim(s) 1-3 and 6 is/are rejected.
- 7) ☒ Claim(s) 4-5, 7-14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>6/02, 8/02, 1/02</u> . | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Claim Objections

1. Claims 10, 14 and 19 are objected to because of the following informalities: the phrase "an number of output time domain values..." should be "a[[n]] number of outputs..." Appropriate correction of the grammatical error is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

- (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.
2. Claims 1-3 are rejected under 35 U.S.C. 102(e) as being anticipated by Dent et al(US Patent# 6,430,391). Regarding Claim 1, Dent et al repeater system meets the following limitations of the claim:
 - (ii) deriving an estimate of said interference and storing the derived interference estimate; **Abstract;**
 - (iii) resuming said transmission of the second signal; and **Abstract;**
 - (iv) modifying said digital filter coefficients using said stored interference estimate and said second signal, to reduce the difference between said second signal and said master signal. **Abstract;**

Regarding step (i), the step of interrupting the transmission of the signal is implied by the step of storing the signal disclosed by Dent et al in the invention.

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Regarding Claim 2, Dent et al repeater system meets the following limitations of the claim:

step (iv) is repeated iteratively, whereby the difference between said second signal and said master signal is successively reduced. **(Column 8, line 65 to Column 9, line 17)**

Regarding Claim 3, Dent et al repeater system meets the following limitations of the claim:

a first parameter is derived characterizing the difference between said second signal and said master signal, and step (iv) is repeated until the value of said first parameter traverses a predefined convergence value. **(Column 9, line 13-17)**

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dent et al (US Patent # 6,430,391) in view of Ryu (US Patent #4,789,993). Dent et al meets all the limitations of claim 6 (See above paragraphs) except disclosing the exact coupling between the filter, cancellation unit, and subtractor.

However, Ryu shows a single frequency repeater that cancels interference (abstract) by using a variable frequency filter (fig 1, item 5) that is coupled to an adder (fig 1, item 4) and demodulator (fig 1, item 7) in a feedback loop for interference cancellation. For the

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specific operation of the invention please see Column 5, lines 41-60. Therefor it would have been prima facie obvious to have a circuit for interference cancellation in a repeater wherein a filter is connected to an adder in a feedback loop. A motivation to combine is that a feedback filter loop is a commonly used circuit for *iteratively* reducing the interference as a signal is received.

Allowable Subject Matter

4. Claims 15-23 are allowed. Claim 14 would be allowable if the above objection is overcome. More specifically regarding the limitations of Claim 14, the prior art failed to teach the following feature:

employing said discrete Fourier transform of the second signal to derive correction values for said digital filter coefficients expressed in the frequency domain

For claim 15, the prior art failed to teach the following features:

- (ii) estimating an error in said estimation of differences between consecutive segments of the master signal;
- (iii) modifying said digital filter coefficients to reduce said estimated error.

For claim 16, the prior art failed to teach the following features:

a switch which selectively transmits the second signal to the amplifier of the relay station;

whereby the switch can be controlled not to transmit the second signal when it is desired to estimate multipath interference in the first signal.

For claim 19, the prior art failed to teach the following feature:

each of the digital coefficients of the digital filter modifying the first signal at pairwise time delay intervals $T_{sub.p}$, and a digital signal processing unit which determines the filter coefficients by:

For claim 20, the prior art failed to teach the following feature:

the digital signal processing unit being arranged to derive an estimate of differences between consecutive segments of the master signal,

estimate an error in said estimation of differences between consecutive segments of the master signal,

modify said digital filter coefficients to reduce said estimated error.

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5. Claim 4-5 and 7-13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry Vartanian whose telephone number is 571.272.3048. The examiner can normally be reached on 10:00-6:30 Mondays to Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 571.272.3056. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Harry Vartanian
Examiner
Art Unit 2634

HV



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